

### REMARKS-General

The newly drafted independent claim 6 incorporates all structural limitations of the original claim 1 and includes further limitations previously brought forth in the disclosure. No new matter has been included. All new claims 6-23 are submitted to be of sufficient clarity and detail to enable a person of average skill in the art to make and use the instant invention, so as to be pursuant to 35 USC 112.

#### Regarding to Rejection of Claims 1-5 under 35USC102

The Examiner rejected claims 1-5 under 35U.S.C. 102(b) as being anticipated by, or in the alternative, under 35U.S.C. 103(a) as obvious over Muramatsu et al (US 4,498,810) and Japanese reference (10-204853). Pursuant to 35 U.S.C. 102, "a person shall be entitled to a patent unless:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

In view of 35 U.S.C. 102(b), it is apparent that a person shall not be entitled to a patent when his or her invention was patent in this country more than one year prior to the date of the application for patent in the United States.

However, the Muramatsu patent or Japanese '853 and the instant invention are not the same invention according to the fact that the independent claim 1 of the instant invention does not read or rely upon or adhere to the Muramatsu patent or Japanese '853. Apparently, Muramatsu patent or Japanese '853 fails to anticipate the distinctive features of the instant invention as follows:

(a) Regarding to claim 6, the programmable tidal current control gate (PTCCG) at an estuary of a river, wherein Muramatsu or Japanese '853 is silent regarding any location of the gate with respect to the river.

(b) In claim 6, "the flood water is guided to flow into the floods receiving lake when the PTCCG is closed" is claimed, wherein Muramatsu or Japanese '853 does not teach any lake to collect the flood water when the gate is close.

(c) In claim 6, "re-open the PTCCG for discharging the flood water into the sea" is claimed, wherein Muramatsu or Japanese '853 fails to teach the control of the disastrous flood in large rivers by discharging the flood water into the sea.

(d) In claim 7, Muramatsu or Japanese '853 fails to teach the gate is constructed at a narrower portion of the estuary.

(e) In claim 8, Muramatsu or Japanese '853 fails to teach the gate is constructed at a coast tangent of a river mouth.

(f) In claims 9 to 11, Muramatsu or Japanese '853 fails to teach the gate is fabricated of multi-sectional flat sluice gate.

(g) In claims 12 to 13, Muramatsu or Japanese '853 fails to teach a span covered by the PTCCG is between 20% and 80% of a width of the narrower portion of the estuary.

(h) In claims 14 to 16, Muramatsu or Japanese '853 fails to teach the PTCCG is used for a period of 7 days to 14 days.

(i) In claims 17 to 23, Muramatsu or Japanese '853 is silent regarding the flood water is discharged into the sea when the water level in the floods receiving lake is higher than the sea level.

Accordingly, Muramatsu or Japanese '853 fails to anticipate the distinctive features (a) to (i) of the instant invention as claimed in claims 6 to 23.

In addition, the applicant respectfully points out the differences between the instant invention and the cited arts throughout the disclosure.

Regarding to the difference between the objectives of the instant invention and the cited arts, the instant invention is targeting at the control of the disastrous flood in large rivers of the world, such as the Yangtze and the Ganges. The objectives are to control the inflow of the sea tidal current at large river mouths, to prevent saline water from entering the river mouth, to increase the flow-rate and speed of water flow within a narrow path for navigation and to lower down the water level (since the quantity of water in the lower reaches of these large rivers is reduced) so that the gradient of the rivers at

the lowland regions increases. The increase in gradient will increase the velocity and the discharge rate of run-off flow of the river significantly.

Muramatsu's patent is to improve the performance of the prior art rubber dam by introducing a new control system in relation to the method of inflation and deflation of a collapsible rubber dam, and by providing a collapsible rubber dam with a piping for the supply and discharge of fluid (such as air, water and the like) which can deflate the rubber dam by atmospheric discharge every time without laying piping beneath the riverbed and without staying the drain in any portion of the piping. The another object of Muramatsu is to provide a collapsible rubber dam provided with a piping for supply and discharge of fluid, a port opening of which is arranged in such a position that a stress is not significantly applied to the port opening even in the case of the change of water level and occurrence of back flow. The prior art rubber dam exists before Muramatsu's invention of control system.

Japanese '853 discloses an automatic electronic system to determine the best timing when the dam gate or pumps should be opened and switched on respectively. The conditions or criteria to do so are determined according to the data collected and computed by the comparison of the preset value of the operator and the detected and analyzed result of the "Difference of Water Level" at the two sides of the dam. Japanese '853 is not concerning with the usage of the dam itself.

Regarding to the difference between the structure or operation of the instant invention and the cited arts, the instant invention is an in-depth study and method of flood prevention and control at large rivers, not small streams or rivers. The main concept or object of the method or system is to reduce the damage caused by the flood by means of a dam, which is materially different from collapsible rubber dams. The constructions and scale are much complicated and purposed built than the rubber dam. Roads and towns can be built with the PTCCG. The instant invention requires the PTCCG dam to be built and operated according to the ways determined by the inventor/designer or society. The major structure or operation is to block the inflow of sea tidal current at high tide, and release or discharge the water at low tide after the water level inside the PTCCG/dam exceeds the outside level. This concept has never been used in the large rivers though simple, yet effective and altruistic.

Muramatsu's patent tries to achieve by the provision of a collapsible rubber dam secured to a riverbed portion and slope portions of both riverbanks only at an upstream side of a river and fulfilling the inflation and deflation functions by supply and discharge of a fluid. An end of a pipe for supply and discharge of said fluid communicates with the inside of the rubber dam from the slope portion of at least one riverbank except the riverbed portion securing the rubber dam. Further, Muramatsu's system concerns with the miscellaneous way and precautions to achieve this inflation and the deflation including the pumping and ducting arrangement, also providing at its inside with at least one protruding member having a rigidity to withstand water pressure and extending along the longitudinal direction of the rubber dam and how to install the rubber dam.

Japanese '853 discloses by installing electronic instrument, the operator should be able to obtain and input data in relation to the water level at the two sides of the dam. After internal computation by comparing the value of the difference of the water level and the preset target, changing the computed data/value into electronic output signals which in turn control and determine the order and amplitude of the opening and closing the dam gate and likewise the operation of the water pump, the dam gates and pumps will be programmed to operate automatically.

Regarding to the difference between the function of the dam of the instant invention and the cited arts, the design and construction of the PTCCG of the instant invention is to control flood by preventing the inflow of tidal current from the ocean which is tremendous in volume. By installing and building the PTCCG, the water level inside the dam will be significantly lowered down, since the water inside the river mouth is much less than before (instead of increasing it). This is one of the distinctive features different from the other 2 inventions herein: the Japanese '853 and Muramatsu's patent. The PTCCG shall speed up the flow run-off and discharge the flood water and the logged water into the sea.

Regarding to the Muramatsu's patent, the function of the dam by itself is not the object of invention or the target. This collapsible rubber dam is not a specialized dam except it can be inflated and deflated by methods aforesaid. The function of withholding certain volume of water can be achieved by any other types of dam, however, for the small streams it is very conveniently controlled by the collapsible rubber dam.

Regarding to Japanese '853, the function of the dam itself is also not the object of the invention or the target. Therefore, it does not tell how to deal with the water stored by the dam. The general effect to the river is to slow down the flow and store the run-off. The operation of the dam, gate and pump as described in Japanese '853 do not spend any effort or words or claim anything in relation to the prevention of floods by rivers and tides and/or the increase of the efficiency of discharge of floods from rivers.

Regarding to the difference between the size of the dam, scale of floods and effect of the instant invention and the cited arts, PTCCG of the instant invention is used and applicable mainly to the large rivers such as the Yangtze and the Ganges, where the sea tidal difference is high and (4.5, and 7m consecutively) the volume of flood / water is tremendous (100 billion  $m^3$ ). This is impossible to deal with by pumps, if it is not operated by gravity. The effect of installation of PTCCG is far reaching and felt even at a distance far away (1,300km) from the river mouth. This scale of study and effect is not predicted or foreseeable by the 2 inventions: Japanese '853 and Muramatsu's Patent.

Regarding to Muramatsu's patent, the material used by the rubber dam is brittle or tender, so it is not suitable to be used in the large rivers such as Yangtze River, River Thames or the River Rhine. This is only applicable with the small size streams or small rivers.

Regarding to Japanese '853, the scale of the dam is of no concern with the invention. The inventor is only interested in the difference of the water levels and the computation as aforesaid and the operation method. It is very easy to imagine that the capacity or the scale of PTCCG is or order 2 or 3 mathematical index (100~1000 times) larger than any gate, which can be operated by pump.

Accordingly, the instant invention is new in the sense that the effect and scale of benefit have not been disclosed and materialized before. The dam, which was built to prevent, block storm and the storm surge from sea is different from PTCCG and this invention. This method is made use of the continual and periodic operation within the flood periods. This increases the discharge rate of the river in each tide cycle especially at spring tide. It will completely eliminate the water-log phenomenon in Chinese Yangtze, Bangladesh, and the South East Asian countries.

The Muramatsu's invention also tries to deal with the issues relating to moisture contained in air being condensed during the pumping to form a drain, which remains in the rubber dam and pipe. The Muramatsu's invention will eliminate the drawbacks of the previously troublesome and inefficient rubber dams. Further, when the rubber dam is automatically deflated (which is usually performed by the automatic opening of a float valve) in case of such an emergency that the water level in the river abnormally increases due to flood or others, if the drain produced by condensation phenomenon remains in the pipe-line, the closed air cannot be discharged from the rubber dam. Moreover, the drain may break the pipe due to freezing. Here, Muramatsu has failed to foresee or take the opportunity to control the flood water by means of Muramatsu's invention (if any or possible).

Japanese '853 is an automatic system to operate the dam gates and pumps. This is better than a system which is relying on human judgment and operation.

According to the location of the dam of the instant invention, this is only effective at the river mouth of the large rivers. It serves as a barrier and separation of the ocean and larger river mouths. The Meteorological Tide only exists in the great oceans. This kind of tide and high water level will extend into the interior river or lakes (but within the tidal current limit and force) if the PTCCG is not built. This is an important factor, which affects and determines the flood control condition of the large rivers. Therefore, the location and exact position of the PTCCG is very important in order to obtain the best results.

The location of dam disclosed by Muramatsu's invention is used only in very small river and at an upstream side of a river. The exact position of the dam is not very crucial to produce the effect.

Although the specification of the Japanese '853 does mention that the dam gate and pump could be "built or erected at the river mouth", the dam gate of the Japanese '853 could be installed or placed at different parts of the river or lake so long as there are needs to replace the manual control with automatic electronic control system. The "building or erection at the river mouth" itself does not form part of the claims or become a distinctive feature of the patent. The exact position of the dam is not very crucial to produce effect.

Additional functions of the instant invention which can be achieved by the PTCCG or dam at the large river mouth include navigation by increasing the water level or depth of the river during dry seasons and ebb tide, resolution of saline water intrusion, establishment of a sailing channel (if necessary) and extension or increase the size of inland port or harbors.

Muramatsu's invention does not tell any other specific function of the dam except natural storage of water and the device or pipes to control the inflation and deflation of the rubber dam.

The Japanese '853 system does not tell any specific function of the dam. This is only about a device to operate the dam gate and pump.

The applicant respectfully submits Muramatsu's invention merely discloses a collapsible rubber dam secured to a riverbed portion and slope portions of both riverbanks only at an upstream side of a river and inflated and deflated by supply and discharge of a gas without any mention of any gate opening and closing in responsive to the tide current.

On the other hand, the claims and specification of Japanese '853 refer and deal with a kind of electronic automatic control system used on river dam. The objective of the system is to determine when the pump should be switched on and when the dam gate should be opened or closed. The control is based on the data collected and computed in relation to the difference between water level meters on both sides of the dam, H1 and H2. Such data shall be converted into electronic signals controlling the switch of the gate and sequence, and the switch of the water pump. The invention emphasis on changing the computed data / value into output signals which in turn control and determine the order and amplitude of the opening and closing the dam gate and likewise the operation of the water pump.

We all understand the nature and the fact that there are a lot of methods to deal with or discharge floods, and the dam could be used to generate electricity and improve waterworks etc. However, the main theme of the instant invention is to describe, feature or acknowledge the methods of prevention or discharge of floods, and to illustrate or present a more efficient way to do so by erecting or installing PTCCG in the tidal current areas of estuary.

One of the main targets of the instant invention is to supplement the technical insufficiency of the present flood control technology. The PTCCG provides an efficient and convenient way of controlling and discharging flood.

Next target of the instant invention is to show how to utilize this method so that vast amount of energy that is saved by blocking the inflow of flood tide could be used to speed up the flow of discharge, and to materialize a flood prevention system in a larger capacity at a faster discharge rate and others as aforesaid. (please refer to the specification of this Application pages 5-12).

As to the claims of the Japanese '853, the difference between them is that the instant invention is "to build up a PTCCG at the river mouth within the tidal limit". The instant invention does not mention anything about the gate and water pump operation. Further, not only can the PTCCG be built at the river mouth tangential to the coast, but also at the narrower inner part of the river mouth so long as the PTCCG does not exceed the tidal limit, whereas, the gate of the Japanese '853 could be installed or placed at different parts of the river or lake so long as there are needs to replace the manual control with automatic electronic control system.

The instant invention suggests that the PTCCG when not in use during high tide is normally open. However, Japanese '853 is only concerned with the operation of the gate and pump with reference to the water levels inside and outside of the gate. The gate is normally closed for water storage.

In order to reduce the construction cost and make use of the PTCCG roof, the instant invention can also be strategically and selectively located for traffic improvement or others. Therefore, the instant invention suggests that the erection of the PTCCG is not necessarily be fully extended across the river. A span of 20% - 80% of the width of the river is enough. Similarly, the PTCCG is also not necessary to build at the river mouth outermost position (tangential to the coast) and occupy full length of it. On the other hand, the dam as described by Japanese '853 does not mention the length, nor the coverage over the river. It could be covering or building across 100% of the river mouth without spare space.

The applicant believes that the above distinctive features of the instant invention have clearly shown that it is fundamentally different from that of Japanese '853. By comparing the functions of the dams and gates, the PTCCG should be designed and

constructed with substantial and creative improvements to control and discharge flood water into the sea at the large river mouth, which is beneficial to mankind in the following three main aspects. Firstly, it can resolve the problem of river flooding. Secondly it also helps navigation by increasing the water level or depth of the river during the dry season and ebb tide. Thirdly, it can resolve the problem of saline water intrusion. They are more particularly explained in paragraphs 37, 38, and 39 below:

After the building, installing and operating of the PTCCG at the river mouths, the flood water level at the lower stream will be substantially lowered down since the vast volume occupied by tide is emptied out, as a result the gradient of the river at the lowland plain will become steeper and increase the discharge rate, this is very beneficial to the flood control. If the instant invention is put into practice and applied in the Yangtze River, it will be very useful to resolving the floods problem in the middle and at lower stream of the Yangtze River and River Huai.

The feasibility analysis is as follows :

(a) After operating the PTCCG at the Yangtze Rivers, the flood water level at the main trunk of the lower stream would be substantially lowered down. As a result the cities, which had flood combating capability of once in 50 years shall be overcome completely and those with flood combating capability of once in 20 years would be improved to once in a hundred years. Then, we could claim that the floods problem at the lower stream of Yangtze is substantially resolved.

(b) After the operation of the PTCCG at the Yangtze Rivers, the lower reaches of the Yangtze and the River Huangpu would be isolated from the stormy ocean and storm surge caused by the tropical cyclones or typhoon. This would ensure the safety of Shanghai to be free from the damage like that of the hurricane Katrina in 2005, which caused catastrophe to the New Orleans.

(c) After the operation of the PTCCG at the Yangtze Rivers, the flood water level of the lower reaches of the Yangtze will be lowered substantially, and in turn increase the flood water gradient of the branches, and so the flood discharge rate at the branches will be improved to a great extent. As a result, the flood combating capability of the River Huai would be improved to once in a hundred years. The discharge ability of the Huai

River would be increased by 20 - 25% (i.e. 250-350 million  $\text{m}^3/\text{s}$  every day), and we could claim the total solution to the River Huai flood problem.

(d) After the operation of the PTCCG at the Yangtze Rivers, the flood water level of the lower reaches of the Yangtze would be lowered substantially, and in turn increase the gradient of the exit river Lake Tai. As a result, the logged water would find its way out and be discharged to the Yangtze River, which will lower the water (originally Yangtze River water level is much higher than flood water level of Lake Tai at high tide). The floods problem in Lake Tai area should also be resolved completely.

(e) The Yangtze River is especially dangerous at the middle reaches. The said river water level during the flood season is sometimes 13 - 15 meters higher than the densely populated surrounding plain. Nearly 10 million people have to rely on the strong dyke called the Great Dyke of Jiang Jian. Not only is the dyke dangerous when the flood peak is high, but also the volume of flood water which is tremendous especially the rains concentrate in July and early August every year. After installing and building the PTCCG, the water discharge capacity of the river into the sea is increased by 1 billion  $\text{m}^3/\text{day}$  (i.e. 30 billion  $\text{m}^3$  in the 30 days worst flood period. This volume of water is enough to lower down the water level by 3 meters in an area of 10,000  $\text{km}^2$ .)

The PTCCG of the instant invention can solve the two major constrains or problems that hinder the navigation of the Yangtze River. The PTCCG can be congregated and used to increase the flow rate of the water and can wash away the sand within the existing sailing channel with a 48km long guided dyke(still under construction and extending to 90km). It can also raise the water level of the lower stream inside the PTCCG and solve the problem of lack of water resources during the dry season and ebb tide as shown below:

(i) By constructing the PTCCG, it is expected to deepen the sailing channel from the present 6 - 8m to 15m, and the depth might be a surplus to the newly built Yang Shan Port. As a result the Shanghai Port can be built at the present harbor site of Wei Gao Chiao. It will not be necessary for Shanghai to build a new port on an island 30km away from coast and 70km from the city center. Furthermore, the surface or roof of the PTCCG can be used as a diversion route, and it can be used as a bypass routing and solve the problem of traffic congestion of Shanghai.

(ii) During the dry season and at ebb tide of Yangtze River, PTCCG should be used to raise the water level for the benefit of navigation. By building the PTCCG at the river mouth of the Yangtze, we could raise the water level from ebb tide, and increase the depth of the inner river, which is beneficial to the navigation, and creates a major inland reservoir of 1,500km<sup>2</sup>, and a river port harbor of 360km<sup>2</sup>. The length of the inland ports till 900km further upstream would also be benefited because the water level would be raised by 1.5–3 meters.

The building and operation of PTCCG of the instant invention will separate the seawater from the fresh water. This is a very efficient way to safeguard the fresh water resources. As we may aware, there is a well-known water resource project namely the South to North Water Transfer Project. The project is very important to China, as it will provide prolonged economic development to the Northern China. One of the limitations to the volume transferred to the North China is that the saline water intrusion problem will deteriorate, if large volume of Yangtze water is transferred to the North especially during the dry season. Further, the fresh water supply to Shanghai is also facing the problem of high salinity because of the seawater intrusion. After the erection or building of PTCCG, these two problems could be totally resolved.

To conclude, the instant invention is totally different from that of the Japanese '853 in many aspects, such as its field application, the purpose of instant invention, the technological approach and the expected contribution to mankind. The instant invention is embodied with significant advancement in relation to the river water management, technology and environmental protection. In view of above, Muramatsu and Japanese '853 fail to anticipate the distinctive features of the instant invention as claimed in claims 6 to 23. Applicant believes that for all of the foregoing reasons, all of the claims are in condition for allowance and such action is respectfully requested.

#### **The Cited but Non-Applied References**

The cited but not relied upon references have been studied and are greatly appreciated, but are deemed to be less relevant than the relied upon references.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration and withdrawal of the objection are requested. Allowance of claims 6 to 23 at an early date is solicited.



Should the Examiner believe that anything further is needed in order to place the application in condition for allowance, he is requested to contact the undersigned at the telephone number listed below.

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#### CERTIFICATE OF MAILING

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